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Online Public Lecture

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A Look Inside the Ivory Tower



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THE HIRAX TELESCOPE

With

Professor Kavilan Moodley



Wednesday 04 OCTOBER | 17h00 - 18h00

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ABOUT THE TALK: In this talk, I will present the Hydrogen Intensity Mapping and Real time Analysis eXperiment (HIRAX) project, which is a proposed 21cm intensity mapping experiment operating at 400-800 MHz that will measure the evolution of dark energy over the redshift range $z=0.8-2.5$ by using the characteristic baryonic acoustic oscillation scale as a standard ruler. The HIRAX radio telescope array will be sited in the radio-quiet Karoo astronomy reserve in South Africa and will ultimately comprise 1024 dishes, each six metres in diameter, placed in a compact configuration. I will discuss the design and project status of HIRAX, its scientific prospects and engineering challenges. This includes studying dark energy and prospects for interesting cosmological constraints from combining HIRAX data with other large-area cosmological surveys in the southern sky. HIRAX will also discover many pulsars and transients, including fast radio bursts (FRBs). I will briefly describe our programme to localise these FRBs using HIRAX outriggers in African partner countries.



ABOUT THE SPEAKER: Kavilan is currently full professor in the School of Mathematics, Statistics and Computer Science, and director of the Astrophysics Research Centre, at the University of KwaZulu-Natal. He completed his PhD in 2002 at the University of Cambridge, after which he worked as a postdoctoral researcher in astrophysics at the University of Oxford, before returning to South Africa in 2003 to take up an academic faculty position at UKZN. Kavilan's research interest is in the area of cosmology and involves confronting cosmological theories with observational data, in particular observations of the cosmic microwave background and large-scale structure. Kavilan served as a scientific board member of the international Atacama Cosmology Telescope project, a member of the international science working group for the Square Kilometer Array Project, and as an associate editor for the SA Journal of Science. In 2007, Kavilan won the SA

Institute of Physics Silver Jubilee Medal. Kavilan has published over 100 research papers with over 8000 citations, and has delivered invited lectures at several international conferences, including the COSPAR Scientific Assembly in 2018. He is currently the principal investigator of the HIRAX telescope project, which aims to measure the evolution of dark energy and localise fast radio bursts.

